Chapter I.—GENERAL EXPLANATIONS

This volume presents the statistics of the seventh biennial census of manufactures, which covered industrial operations during the calendar year 1933. The census of manufactures was taken decennially prior to 1899 and for each fifth year thereafter until 1919, and has since been taken at biennial intervals.

1. **Legal provision for biennial census.**—For the biennial censuses of manufactures, somewhat less detailed and comprehensive than the quinquennial censuses formerly taken, legal authority is found in section 32 of the Fourteenth Census Act and in section 17 of the Fifteenth Census Act.

2. **Area and period covered.**—The canvass covered the 48 States and the District of Columbia. The returns represent a year's operations, except for establishments that began or discontinued business within the year. In most cases they relate to the calendar year 1933, but in a few cases they cover fiscal years differing from the calendar year.

3. **The canvass.**—Schedules were mailed in January, 1934, immediately after the close of the year covered by the census, to all manufacturers who had reported at the census for 1931 and to others whose names were obtained from various sources, such as trade directories. About 75 percent of the manufacturers sent in their returns by mail, and the majority of those who failed to do so within a reasonable time were reached through telephone calls or in some cases personal visits made by field representatives of the Bureau. The usual cooperative arrangements were made with the Forest Service, of the Department of Agriculture, and the Department of Labor and Industries of Massachusetts.

4. **Incompleteness of coverage.**—Because of the necessity of making the canvass with a field force considerably smaller than the field forces employed on former censuses of manufactures, the 1933 coverage of some of the industries was not quite complete; but the degree of incompleteness was not sufficient to have any material effect on the comparableness of the 1933 figures with those for earlier years, except in the case of the "Number of establishments" item. That is to say, the establishments that were active in 1933 but were not accounted for in the canvass were of little or no industrial importance.

Of the 175,325 establishments that had reported for 1931, 8,595 failed to supply any information in regard to their status (active, idle, out of business, etc.) or their activities in 1933, but these establishments had contributed only nine-tenths of 1 percent of the aggregate number of wage earners employed by all establishments reporting for 1931. For a very few industries the degree of incompleteness, thus measured, exceeded 3 percent, but in the great majority of cases it did not exceed 1.5 percent. Moreover, it is certain that some of the establishments that reported

for 1931 but not for 1933 were idle or out of business in the later year, or made products valued at less than $5,000. (See sec. 8*d*.) The percentages of incompleteness, based on the 1931 wage-earner figures, are given, exactly or approximately, in the reports for the respective industries (Chapter III).

Although, as explained above, the field force employed on the 1933 canvass was comparatively small, returns were nevertheless received from approximately 3,000 establishments that had not reported at previous censuses.

5. **The schedules.**—Because of the reduction in the size of the field force as compared with previous censuses (see sec. 4), it was necessary to curtail the field work somewhat. This was accomplished in three ways:

(*a*) By curtailing the amount of detail called for by most special schedules (those which specify the kinds or classes of products for which data are to be reported) and by omitting, except in a very few cases, the inquiries calling for data on consumption of materials by kind, quantity, and cost, formerly carried on the schedules for many industries. Special schedules were used in canvassing 153 of the 308 industries covered by the Census of Manufactures.

(*b*) By substituting the "General" schedule (which, being adapted for use in canvassing any industry, does not specify the kinds or classes of products for which data are to be reported) for the special schedules used at former censuses in canvassing 81 industries. In all, 155 industries were canvassed with the General schedule at the Census for 1933.

(*c*) By using an abridged schedule for canvassing the smaller establishments in many industries. This abridged schedule called merely for data on employees and their compensation, total cost of materials, fuel, etc., and total value of products. With a very few exceptions, the establishments in any industry for which this schedule was used did not contribute more than 10 percent of the total value of products for the industry, and in most cases the percentage was considerably smaller. So far as practicable, the data returned on the abridged schedule were distributed among the proper items in the tables giving detailed production statistics (table 2 in the reports for most industries, as presented in Chapter III). Where this could not be done, two sets of detailed production figures are given for 1931, one comparable with 1929 and the other adjusted for comparison with the 1933 figures derived from the standard schedules; or—especially in the cases of the less important industries—the total value of products reported on the abridged schedule for 1933 is carried as a single item at the end of the table and only one set of figures is given for 1931.

6. **Publication of the statistics.**—The more important statistics were first given out in mimeographed or in rotaprinted press releases, issued as preliminary and subject to revision. Most of the final statistics were published in the form of printed pamphlets, but some of them were issued only in rotaprinted form. All the reports that were printed in pamphlet form, together with some additional material, have been assembled in this volume. (See sec. 7.)

The preliminary industry reports, subject to revision, each covering a single industry, were issued in mimeographed form during the period from April 2, 1934, to January 4, 1935; and a rotaprinted summary by industries was published on January 23, 1935. The several series of rotaprinted reports listed in section 7 were issued during the period from January 23 to August 9, 1935.

The final series of industry reports, 38 in number, each covering a small group of related industries, were issued in pamphlet form. The preparation of these reports was completed on April 12, 1935.

7. **Abridgment of the reports.**—As a result of the curtailment of the schedule (see sec. 5*a*), the amount of statistical material given in the reports has been correspondingly reduced. Moreover, in order further to reduce the amount of manufactures-census printing, the reports and tables named below have been omitted from this volume. These reports and tables have, however, been prepared and are available for distribution in rotaprinted form.

STATISTICS BY INDUSTRIES, FROM STANDARD SCHEDULES (SEE SEC. 5)

General Statistics (derived from standard schedules), by industry groups and by Industries, for the United States: 1933.

(This table is similar to the table beginning on page 21 (derived from all schedules), except that it gives figures for number and compensation of salaried employees under two heads, namely, "Superintendents and managers" and "Clerks and other subordinate employees." As they have been derived from the standard schedules only, the figures are incomplete except for industries that were canvassed solely by means of those schedules. The complete figures for each industry (derived from both the standard and the abridged schedules) will be found in the table beginning on page 21.

WAGE-EARNER EMPLOYMENT, BY GEOGRAPHIC DIVISIONS AND BY STATES

Table 1.—Wage earners, by quarters, for geographic divisions and for States: 1933 and 1931.

Table 2.—Wage earners, by months (standard schedules), for geographic divisions and for States: 1933.

WAGE-EARNER EMPLOYMENT, BY INDUSTRY GROUPS AND BY INDUSTRIES

Table 1.—Wage earners, by quarters, for industry groups and industries: 1933 and 1931.

Table 2.—Wage earners, by months (derived from standard schedules), by industry groups and by industries: 1933.

STATE SUMMARIES BY INDUSTRIES AND BY CITIES AND COUNTIES

A series of tables, one for each State and one for the District of Columbia, giving summary statistics by industries for 1933.

A series of tables, one for each State, giving summary statistics for cities having 10,000 inhabitants or more and for counties, for 1933, 1931, and 1929.

INDUSTRIAL-AREA AND CITY SUMMARIES, BY INDUSTRIES

A series of reports, one for each of 32 industrial areas (see sec. 28), giving summary totals by counties and summary statistics by industries for the area as a whole. Summaries by industries for New York, Chicago, and Philadelphia were also published.

8. **Scope of the census.**—The census statistics are compiled primarily for the purpose of showing (1) the production of each important class or kind of manufactured commodities and the increase or decrease therein; (2) the absolute and the relative magnitude of the various manufacturing industries covered, and their growth or decline; and (3) the industrial importance of individual States and other areas.

a. General and detailed statistics.—The general statistical items in regard to which data were collected at the biennial census for 1933 are as follows: Number of proprietors and firm members; number of salaried employees; number of wage earners, by months; amounts paid in salaries and wages; cost of materials, containers for products, fuel, and purchased electric energy; value of products. This information was obtained from all manufacturing establishments coming within the scope of the census. In addition, as explained in section 17, data in regard to the quantities and the values of individual classes of products, and in a few cases in regard to materials, were collected from establishments in the more important manufacturing industries.

b. Establishments covered—Definition.—As a rule, the term "establishment" signifies a single plant or factory.

In some cases, however, it refers to two or more plants operated under a common ownership and located in the same city, or in the same county but in different municipalities or unincorporated places having fewer than 10,000 inhabitants.

On the other hand, separate reports are occasionally obtained for different lines of manufacturing carried on in the same plant, in which event a single plant is counted as two or more establishments.

c. Establishments covered—Type.—The censuses are confined, in general, to manufacturing industries proper. Data are collected for a few industries, however, whose activities are not manufacturing in the sense in which the term is generally understood, the most important example being printing and publishing. The production of motion pictures (not including distribution and projection in theaters) was treated as a manufacturing industry at each census from 1921 to 1929, inclusive, but was not so treated at the censuses for 1931 and 1933. The industry was canvassed, however, and reports on it were published in pamphlet form.

Beginning with the census for 1904, the following classes of establishments have been excluded:

(1) Establishments which were idle throughout the year or reported products valued at less than $5,000. (See sec. *d*, below.)
(2) Establishments engaged principally in the performance of work for individual customers, such as custom tailor shops, dressmaking and millinery shops, and repair shops. (This does not apply to large establishments manufacturing to fill special orders.)
(3) Establishments in the building industries, other than those manufacturing building materials for the general trade.
(4) Establishments in the so-called neighborhood industries and hand trades, in which little or no power machinery is used, such as carpentry, blacksmithing, tinsmithing, etc.
(5) Cotton ginneries.
(6) Small grain mills (gristmills) engaged exclusively in custom grinding.
(7) Wholesale and retail stores which incidentally manufacture on a small scale, particularly where it is impossible to obtain separate data for the manufacturing and for the mercantile operations.
(8) Educational, eleemosynary, and penal institutions engaged in manufacturing. (Data for the production of binder twine in penal institutions and of brooms in institutions for the blind are, however, collected.)

Most of the establishments of classes 3 and 4 also fall into class 2, their work being done mainly to individual order.

d. Establishments covered—Size.—No data are collected from establishments with products valued at less than $5,000. The exclusion of data for these small establishments reduces considerably the number to be canvassed, but does not materially impair the accuracy of the statistics except for the single item "Number of establishments."

(At the census for 1919, at which the minimum limit was $500, 99.5 percent of the total wage earners and 99.7 percent of the total value of products were reported by establishments whose production was valued at $5,000 or more.)

9. **Classification of industries.**—Although there are thousands of more or less distinct lines of manufacturing activity, manufacturing establishments have been classified for census purposes into 308 industries. (Because of changes resulting from the establishment of new industry classifications and the combination or abandonment of old ones, the number varies slightly from census to census.)

The production of each specific class of finished commodities, however small, might be looked upon as a separate industry; and in some cases certain of the distinct processes in the manufacture of a single commodity might be treated as distinct industries, as, indeed, is sometimes actually done in the census reports. Manifestly, however, there must be some grouping of commodities and processes, not only in order to bring the number of industries within reasonable compass, but also in order to avoid the extensive overlapping which would result from an attempt to distinguish so large a number of industries. Each establishment

must, as a rule, be treated as a unit, and the data reported by it must be assigned in toto to some one industry. In many cases an establishment manufactures several related articles or commodities, or performs several related operations. It is desirable, therefore, that the classification be broad enough to cover all the activities—or, at least, the principal activities—of such establishments.

The effort has been made to distinguish, so far as practicable, each well-defined or well-recognized industry. The classification has been based on prevailing conditions as to the actual organization of industry and the distribution of the various branches of production among individual establishments. It has been necessary, however, in some cases to combine the data for two or more industries which are usually considered fairly distinct from one another, because of the considerable amount of overlapping among them. Such cases arise where, although the majority of the establishments concerned confine their business to one or another of the industries, a few important establishments combine the activities of two or more industries to such an extent as to render it impracticable to obtain separate data for the different lines of activity.

10. **Classification of establishments.**—Each establishment as a whole (a single plant being counted as two or more establishments in certain cases, as explained in sec. 8*b*) is assigned, on the basis of its product or group of products of chief value, to some one industry classification.

The "general statistics" (those for number of establishments, persons engaged salaries and wages, cost of materials, value of products, and value added by manufacture) for any particular industry relate not only to the primary products normally belonging to that industry but also to certain secondary products which normally belong to other industries. For example: Some of the establishments classified in the "Motor vehicles" industry manufacture, as secondary products, tractors, which are normally products of the "Engines, turbines, tractors, water wheels, and windmills" industry, while a few motor vehicles are made as secondary products by establishments engaged primarily in other lines of manufacture.

The treatment of each establishment as a unit and its assignment to some one industry according to its product of chief value sometimes result in overrating the importance of certain industries and underrating that of others. For example: The industry classified as "Wire drawn from purchased rods" embraces, as its title signifies, only those establishments which draw wire from rolled rods purchased from other establishments. Many rolling mills operate wire-drawing departments; and wire and wire products are also manufactured in considerable quantities by establishments classified under the designations "Nonferrous-metal alloys; nonferrous-metal products, except aluminum, not elsewhere classified" and "Electrical machinery, apparatus, and supplies." The total output of wire and wire products by the establishments in the "Wire drawn from purchased rods" industry in 1933 was valued at $68,859,086, whereas the total value of wire and wire products manufactured by all establishments which drew wire in 1933 amounted to $192,932,094. Thus the output of the wire industry represented less than two-fifths of the value of wire and wire products manufactured in all wire-drawing establishments. On the other hand, it should be noted that the $192,932,094 reported as the total for all establishments engaged in drawing wire does not represent the value of wire alone but includes a considerable value of manufactures of wire, such as wire fencing, wire nails and spikes, and wire rope and strand—products similar to those manufactured from purchased wire by establishments under other classifications.

11. **Classification by industry groups.**—To facilitate the comparison of one broad class of manufacturing industries with another, the industries as constituted for census purposes are distributed into 16 general groups, for which summary statistics are given in the table on page 40.

This grouping is based in most cases on the character of the principal materials used, but several of the groups are constituted on the basis of the purpose or use of the chief products, and one, "Chemicals and allied products," on the character of the manufacturing processes employed. It is of course necessary in some cases to include in a particular group certain industries that use considerable

quantities of materials or manufacture considerable quantities of products other than those treated as basic for the group. For example: The furniture industry, included in the "Forest products" group, embraces the manufacture of metal as well as of wood furniture.

12. **Salaried personnel and salaries.**—Salaried employees and salaries have been reported in all the quinquennial and biennial censuses of manufactures with the single exception of that for 1931. The standard schedules (see sec. 5*c*) used at the 1933 census call separately for data on (*a*) administrative employees (managers, superintendents, etc.) and (*b*) subordinate clerical employees. Manufacturers reporting on this schedule were instructed to assign the higher-salaried technical employees to the administrative group and the lower-salaried ones to the clerical group. On the abridged schedule (see sec. 5*c*), however, the number and the compensation of salaried personnel were reported merely as totals, with no breakdown. No data for officers of corporations (presidents, vice presidents, etc.) nor for employees of central administrative offices are included in the reports of this census.

13. **Wage earners and wages.**—Wage earners are defined as skilled and unskilled workers of all classes, including pieceworkers employed at the plant but not those employed elsewhere, and foremen and overseers in minor positions who perform work similar to that done by employees under their supervision. The standard schedules called for data on the numbers of wage earners on the pay rolls on December 15, 1933, and also the numbers on the pay rolls for the week that included the 15th day of each month, if that was a normal week, or for some normal week in the month. The abridged schedule (see sec. 5*c*) provided for reporting the numbers employed in March, June, September, and December.

The average for the year has been calculated by dividing the sums of the numbers reported for the several months on the standard schedule by 12 and on the abridged schedule by 4, and combining the two quotients. In making this computation for highly important seasonal industries, such as canning and preserving, the average of the four months covered by the abridged schedule has been adjusted so as to take account of the monthly fluctuations indicated by the returns on the standard schedules. In the case of any nonseasonal industry, the margin of error resulting from the use of the 4-month average derived from the returns on the abridged schedules as a factor in calculating the average for the entire industry is negligible.

The average for the year exceeds somewhat the number that would have been required for the work performed if all had been continuously employed throughout the year, because of the fact that it is impracticable for the manufacturers in reporting to take into account the extent to which some or all of their wage earners may have been on part time or for some other reason may not actually have worked on a full-time basis during the entire week. Moreover, in cases in which a plant was in operation during only a part of a month, the number of wage earners reported for the week selected would almost certainly be above the average for the month. The quotient obtained by dividing the amount of wages (the total amount paid to wage earners during the year) by the average number of wage earners cannot, therefore, be accepted as representing the average wage received by full-time wage earners. In making comparisons between the figures for 1933 and those for earlier years, the fact that the proportion of part-time employment varied from year to year should be taken into account.

The wage-earner averages given as United States totals in tables 3 and 4, Chapter II, in table 1 of each of the industry reports in Chapter III, and in some of the rotaprinted tables listed in section 7, and those given as State and industrial-area totals in other rotaprinted tables, are not necessarily identical with the sums of the averages for the several industries and the several States, because each average (being a quotient—usually ending in a fraction—obtained by dividing the total of the corresponding monthly figures by 12) is correct only to the nearest unit.

14. **Cost of materials, etc.**—This item, as it appears in the current report, covers the combined cost of materials, containers for products, fuel, and purchased electric energy. The cost of fuel covers coal, fuel oil, gasoline, gas, etc. (See sec. 18, p. 10.)

15. **Cost of contract work.**—The term "contract work"—which does not necessarily imply the existence of a formal contract—is applied both to work done outside the establishment reporting on materials owned by it and to work done in the establishment on materials not owned by it.

Payments made for such work appear under the head "Paid for contract work"; amounts received are reported under "Value of products." The amounts paid for contract work are given in the reports for only those industries in which such work is important, namely, the clothing and leather-glove industries and a few others. In the great majority of manufacturing industries the contract work is small in amount, and in many cases it is merely incidental; that is, it is not a normal or a necessary part of the industry's activity.

16. **Value of products.**—For years other than 1929, the amounts under this heading are the selling values, *f. o. b. factory*, of all products manufactured during the census year, whether sold or in stock (or, for some industries, receipts for all work done), and consequently the total value of products covers cost of production (including overhead expenses) and profits, except in cases where the factories were operated at a loss. It also covers selling expenses except for establishments that maintain separate sales departments, in which cases the values at which the products are turned over to the sales departments are reported. For 1929 the value of products was, for the majority of the industries, the selling value, *f. o. b. factory*, of products *shipped or delivered* during the year, but for 76 industries, including some of the most important ones, it represented products manufactured, whether sold or not.

The value of products is not a satisfactory measure of the importance of a given industry, because only a part of this value is actually created within the industry. Another part, and often a much larger one, is contributed by the value of the materials used. The aggregates for cost of materials and value of products include large amounts of duplication due to the use of the products of some industries as materials by others. (See secs. 18 and 20.) Furthermore, in the cases of several industries the value of products includes considerable amounts representing receipts for contract work. (See sec. 15.)

Some manufacturers sell their products at prices that include freight and other delivery charges, but these transportation charges are deducted wherever possible.

Railroad repair shops manufacture few if any products for sale, their work being done or their products manufactured solely or principally for the use and benefit of the railroads operating them. Since no market value is assigned to the work or the products of railroad repair shops, the value reported by them usually represents the operating cost or the cost of production.

Somewhat akin to the case of the railroad repair shops is that of establishments which make partly finished products, or containers and auxiliary articles, for the use of other manufacturing establishments under the same ownership. For example: A blast furnace produces pig iron for use in the production of steel in plants under the same ownership. In such cases the "transfer value" assigned by the manufacturer is accepted as the value of the product in question. This transfer value is usually based on market prices or on the cost of manufacture, but sometimes it is purely arbitrary.

Primary and secondary products.—The products reported for a given industry usually include minor products different from those covered by the industry designation. They do not, however, include the entire output of products normally belonging to the industry, because some of this class of commodities may be

made in establishments in which they are not the products of chief value. In the case of every industry the value of the secondary products not normally belonging to it, and that of commodities normally belonging to it but made as secondary products by establishments engaged primarily in other lines of manufacture, offset one another to some extent; and in most cases the total value of products as reported does not differ greatly from the value of the total output, in all industries, of the classes of products covered by the industry designation. (See "Classification of establishments," p. 7.)

In most of the product tables in this volume (Table 2 in the reports for most industries) a separate item entitled "Other products (not normally belonging to the industry)," represents the production of commodities which normally are primary products of other industries. It has been necessary in some cases to distinguish between these secondary products normally belonging to other industries and minor or miscellaneous products of the industry covered by the report.

17. **Detailed statistics for products and materials.**—For the more important industries, data as to the quantities and values—or where quantity figures were not available or would have little significance, for the values only—of the separate classes of products were collected and tabulated; and for a few of these industries the quantities and the cost of principal materials used were also reported.

While it is generally impracticable for a manufacturer to assign the proper proportions of the wage earners, wages, etc., to the various lines of manufacturing industry carried on in his establishment, most manufacturers are able to distinguish, exactly or approximately, the quantities and values of the several classes of products made. Special schedules calling for detailed information in regard to products were therefore sent to the establishments in 153 industries, and in some cases two or more special schedules were filled out for a single establishment whose manufacturing activities were of a varied character. The "General" schedule, which was sent to the manufacturers in the remaining 155 industries, also containing spaces for listing the quantities and values of the leading products separately, but in many cases only the total values of products were reported.

The tables giving detailed statistics on the products of a given industry include data for the production of similar commodities normally belonging to that industry but made as secondary products by establishments classified in other industries. In a few cases this secondary production is shown in footnotes. (See sec. 16, "Value of products—Primary and secondary products.")

Detailed data as to materials used were collected from establishments in seven industries, namely, "Flour and other grain-mill products," "Gas, manufactured," "Meat packing," "Pulp (wood and other fiber)," and the three rubber industries.

18. **Duplication in cost of materials and value of products.**—In making use of the statistics for cost of materials and value of products for groups of industries or for all industries taken as an aggregate it must be remembered that they include a large amount of duplication due to the use of the products of certain establishments as materials by others. The net value of all manufactured products is estimated to have been approximately two-thirds of the gross value for 1929. (See table 7, p. 36, Vol. II of reports for that year.) No corresponding estimate has been made for subsequent years.

This duplication occurs, as a rule, between different industries and is not found to any great extent in individual industries. To illustrate: Manufacturers classified in the "Rubber tires and inner tubes" industry sell a part of their output to manufacturers in the "Motor vehicles" industry for installation on new cars and trucks. Thus the value of these tires is included in the total values of products of two industries.

The occasional occurrence of duplication between different establishments in the same industry is exemplified in "Meat packing," where certain packing establishments purchase fresh meat from slaughterhouses for use as their material. The total value of products reported

for the industry, therefore, includes the factory value of products which pass through further manufacturing processes in other establishments.

19. **Relation of wages to cost of materials and value of products.**—In making comparisons between the wages paid in manufacturing industries and the cost of materials and value of products of these industries, it should be borne in mind that whereas the material and product totals for industry groups or for all industries taken as an aggregate contain large amounts of duplication (see sec. 18), the wage figures are free from duplication.

Moreover, the cost of materials, excluding the duplication therein, is made up in considerable part of wages paid to wage earners in nonmanufacturing industries, such as agriculture, mining, fisheries, and transportation. For example: The iron ore used as a material in blast furnaces comes from iron mines and is transported to the furnaces by rail or by water. The cost of the ore at the mines consists in part of the miners' wages, and the cost of the ore delivered at the furnace includes also the wages paid to the employees of the navigation or railroad company which transported it. The pig iron produced by the blast furnaces is used as a material by steel mills. Thus the cost of this material is made up in part of the miners' wages, in part of the wages paid to the transportation employees, in part of the wages of the blast-furnace employees, and in part of other items. The wages paid the blast-furnace employees are included in the total wages shown by the manufactures reports, but the miners' wages and the wages of the transportation employees are not included. Moreover, the cost of the pig iron used as a material by the steel mills includes that of the iron ore, fuel, and supplies used by the blast furnaces. If the steel mill and the blast furnace were treated as a single establishment, this duplication would be eliminated and the cost of materials would be that of the iron ore, etc., used by the blast furnace, and the corresponding duplication in value of products would also disappear. If the mine, the transportation company, the blast furnace, and the steel mill were operated under a single ownership and treated as a single establishment, the cost of materials would be reduced to the value of the ore in the ground and the cost of fuel and supplies; the value of products would be a net amount representing the output of the steel mill alone instead of being made up of the value of the steel-mill products plus the value of the blast-furnace products; and the wage item would cover all wages instead of being limited to the wages paid in the blast furnace and the steel mill.

Thus, if the aggregate amount of wages paid both in manufacturing industries and in those industries which supply the raw materials used by manufacturers were compared with the net cost of materials, fuel, etc., or with the net value of manufactured products in the form in which they reach the ultimate consumer, the ratio of the first amount to the second or to the third would be much larger than the ratio of the wages paid in manufacturing industries alone to the gross cost of materials or to the gross value of manufactured products.

20. **Value added by manufacture.**—For some purposes, the most satisfactory measure of the importance of an industry is the "value added by manufacture"—that is, the increment created by the manufacturing processes. This measures the net addition to the value of commodities in existence—i. e., raw materials, semimanufactured materials, and fuel.

It is calculated by deducting the cost of materials, containers, fuel, and purchased electric energy used from the value of the products. (The cost of purchased energy is included in the amount deducted because it is not reported separately by the manufacturers.)

In comparing manufacturing industries with one another the relation between the value of finished products and the cost of materials should be kept constantly in mind. The products of one industry may be valued at the same amount as those of another, but the one may have added several times as much value to the materials as the other, and may therefore have been of correspondingly greater economic importance.

The "value added by manufacture" is almost entirely free from the duplication that is a factor in the total value of products (see sec. 18), but it is inflated slightly by the inclusion in the value of products, *but not in the cost of materials*, of the amounts received for contract work done (reported as "value of products" by some of the establishments in certain industries. The amount of this duplication is insignificant except in a few industries, particularly the manufacture of clothing.

21. **Production as measured by physical volume.**—Because of price changes, the cost of materials, values of products, and value added by manufacture for different census years are not properly comparable. Statistics of the actual physical quantities of products manufactured provide the most trustworthy measure of the growth or decline of manufactures, but they are not available for all industries.

The number of wage earners employed is also a fairly satisfactory standard but it must be remembered that, on the one hand, in some industries mechanical processes have displaced hand labor to such an extent as to make possible a marked increase in production with no increase in the number of wage earners while, on the other hand, the average number of hours of labor per week has been decreasing for many years.

A study of the physical volume of output as disclosed by census figures was made for the Bureau of the Census by Edmund E. Day and Woodlief Thomas, and the results were published in 1928 under the title "The Growth of Manufactures," as one of a series of Census monographs.

The index numbers of physical output given in table 1, page 17, for 1899 to 1925, inclusive, are the Day-Thomas figures for those years. The indexes for subsequent years have been computed by the same method—those for 1927, 1929, and 1931 by Miss Aryness Joy, of the Federal Reserve Board, and that for 1933 by Mr. V. S. Kolesnikoff, of the Central Statistical Board.

The figures in the second column of table 1, representing the total volume of wage-earner employment in 1899 and each subsequent census year, are a series of relatives computed by dividing the number of wage earners (average for the year) employed in manufacturing establishments in 1899 into the average number for each census year and multiplying the quotient by 100. "Production per wage earner" (fourth column), determined by dividing the index of physical output for each census year by the wage-earner index in the second column, indicates the general trend in output per wage earner.

22. **Profits and losses.**—As the census statistics do not show total production costs, they cannot be used as a basis for the calculation of profits and losses.

Costs for which data have not been collected comprise depreciation, interest, insurance, rent, taxes (except internal-revenue taxes on tobacco and alcoholic beverages and, in a few cases, processing taxes), and other miscellaneous items.

The deduction of the sum of salaries, wages, and cost of materials, containers, fuel, and purchased electric energy from the value of products leaves a miscellaneous item (equal to the remainder obtained by subtracting the salary and wage items from "value added by manufacture") representing all other manufacturing expenses plus manufacturing profits (or minus manufacturing losses), but no basis exists in census data for distributing this amount among the constituent items of expense and profits. In fact, the books of a manufacturer who actually operated at a loss might nevertheless show a considerable excess of value of products over the sum of the expense items reported to the Cenus Bureau.

23. **Statistics for earlier census years.**—For the purpose of general comparison of industrial activity in different census years, a summary covering the period from 1849 to 1933 is given in table 2, Chapter II; and comparable figures for the last 4 census years are given in table 1 of the report for each industry, in Chapter III.

Although the manufacturing industries of the country were canvassed at the censuses taken in 1810, 1820, and 1840, the results were not comparable with those of the manufactures inquiries made in 1850 (covering, in the main, industrial activities in 1849) and subsequent census years. The manufactures data collected at the decennial censuses taken during the period from 1850 to 1900, inclusive, covered the so-called "hand and neighborhood trades" in addition to the factory industries. (See sec. 8c.)

24. **Adjustments in figures for earlier years.**—It is sometimes necessary, for various reasons but chiefly because of changes in census classifications, to make adjustments in the figures for earlier census years. When such adjustments are of considerable magnitude, they are explained in headnotes or in footnotes; and when they are insignificant, and do not affect the comparableness of the statistics, the change is indicated by the footnote "Revised."

25. **Items in round figures.**—In most of the tables the monetary figures, and in some cases the quantity figures also, are given in round thousands. Save in a very few exceptional cases, the margin of error resulting from the use of this expedient does not exceed 2 percent. Since each item is correct to the nearest thousand and each total is also correct to the nearest thousand, a given total is not necessarily the exact sum of the items beneath.

26. **Disclosure of data for individual establishments.**—The Bureau of the Census is prohibited by law from publishing any statistics that might disclose data relating to individual establishments.

For this reason it is necessary to omit all the State figures for a few industries and to include, in the "Other States" items in practically all the industry reports and in the "Other industries" items in all the State and industrial-area reports (rotaprinted), the data for certain States and for certain industries, respectively, that are more important than some of those for which separate figures are presented.

In general, separate figures are published in cases where a given industry in a given State or area is represented by three or more establishments. It sometimes happens, however, that one or two establishments produce a very large proportion of the combined output of three or more establishments in a particular State or area, and in such cases separate figures are not given. To illustrate: Suppose that the combined production of two manufacturers amounted to 90 percent of the total for a group of five. Under such conditions either of the two manufacturers in question, knowing that he had only one important competitor in his State or industrial area, could subtract the value of his products from the combined value for the group of five and thus obtain an amount which would not greatly exceed the value of the products of his principal competitor. In cases like this the figures for the group in question are included in the "Other States" items in the industry table or in the "Other industries" items in the State or industrial-area table. In the table giving wage-earner statistics for March, June, September, and December, in the reports for certain industries (Chapter III), however, separate figures for 1933 are given for every State from which as many as three establishments (under separate ownership) were reported.

27. **Changes in industry groups, classifications, and titles.**—The following changes in classification and industry titles were made at the Census for 1933:

GROUP 1.—FOOD AND KINDRED PRODUCTS

Beverages.—Title changed to "Beverages, nonalcoholic."

Coffee and spices, roasting and grinding.—Abandoned as a manufacturing-industry classification.

Liquors, distilled, and ethyl alcohol.—Formerly "Alcohol, ethyl, and distilled liquors"; transferred from Group 6.

Liquors, malt.—In "Liquors and beverages" group at censuses for 1921 and earlier years; not canvassed at censuses for 1923 to 1931, inclusive.

Liquors, vinous.—Transferred from Group 6.

Oleomargarine and other margarines, not made in meat-packing establishments.—Title changed to "Oleomargarine (margarine) not made in meat-packing establishments."

Peanuts, walnuts, and other nuts, processed or shelled.—Abandoned as a manufacturing-industry classification.

GROUP 2.—TEXTILES AND THEIR PRODUCTS

Clothing (except work clothing), men's, youths', and boys', not elsewhere classified.—Children's play suits, windbreakers, lumberjacks, and oiled waterproof outer garments, formerly classified in this industry, transferred to "Clothing, work (including work shirts), men's." Sheep-lined and blanket-lined coats, formerly in "Clothing, work (including shirts), men's," transferred to this industry.

Clothing, work (including sheep-lined and blanket-lined coats but not including shirts), men's.—Title changed to "Clothing, work (including work shirts), men's." Children's play suits, windbreakers, lumberjacks, and oiled waterproof outer garments, formerly classified in the "Clothing (except work clothing), men's, youths', and boys', not elsewhere classified" industry, transferred to this industry. Sheep-lined and blanket-lined coats, formerly in this industry, transferred to "Clothing (except work clothing), men's, youths', and boys', not elsewhere classified."

Furnishing goods, men's, not elsewhere classified.—Men's nightwear, formerly classified in this industry, now in "Shirts (except work shirts) and nightwear, men's."

House-furnishing goods not elsewhere classified.—Title changed to "House-furnishing goods not elsewhere classified and miscellaneous articles made of textiles."

Shirts.—Title changed to "Shirts (except work shirts) and nightwear, men's." Work shirts (including flannel shirts), formerly classified in this industry, transferred to "Clothing, work (including work shirts), men's." Men's nightwear, formerly in "Furnishing goods, men's, not elsewhere classified," transferred to this industry.

GROUP 3.—FOREST PRODUCTS

Refrigerators and refrigerator cabinets, exclusive of mechanical refrigerating equipment.—Abandoned as a separate classification; included in "Refrigerators and refrigerating and ice-making apparatus," Group 13.

GROUP 4.—PAPER AND ALLIED PRODUCTS

Paper goods not elsewhere classified.—Papeteries, formerly classified in "Stationery goods not elsewhere classified," transferred to this industry.

GROUP 5.—PRINTING, PUBLISHING, AND ALLIED INDUSTRIES

Printing and publishing, book and job.—Title changed to "Printing and publishing, book, music, and job," and industry expanded to include former "Printing and publishing, music" classification.

Printing and publishing, music.—Abandoned as a separate classification; now included in "Printing and publishing, book, music, and job."

Printing materials, not including type or ink.—Abandoned as a separate classification; combined with "Type founding" under title "Printers' supplies."

Type founding.—Abandoned as a separate classification; combined with "Printing materials, not including type or ink," under title "Printers' supplies."

Printers' supplies.—New title; see "Type founding," above.

GROUP 6.—CHEMICALS AND ALLIED PRODUCTS

Liquors, distilled, and ethyl alcohol.—Formerly "Alcohol, ethyl, and distilled liquors"; transferred to Group 1.

Liquors, vinous.—Transferred to Group 1.

Druggists' preparations.—Ethical specialties, formerly classified in "Patent or proprietary medicines and compounds," transferred to this industry.

Patent or proprietary medicines and compounds.—Ethical specialties, formerly classified in this industry, transferred to "Druggists' preparations."

GROUP 7.—PRODUCTS OF PETROLEUM AND COAL

No change.

GROUP 8.—RUBBER PRODUCTS

No change.

GROUP 9.—LEATHER AND ITS MANUFACTURES

Belting, leather.—Title changed to "Belting and packing, leather."

GROUP 10.—STONE, CLAY, AND GLASS PRODUCTS

Wall plaster, wall board, insulating board, and floor composition.—Title changed to "Wall board, insulating board, gypsum and other plasters, and floor composition."

GROUP 11.—IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY

Springs, steel, except wire, not made in plants operated in connection with rolling mills.—Establishments engaged primarily in repairing and replacing motor-vehicle springs, formerly classified in this industry, now excluded from census of manufactures.

GROUP 12.—NONFERROUS METALS AND THEIR PRODUCTS

Aluminum manufactures.—Title changed to "Aluminum products."

GROUP 13.—MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT

Elevators and elevator equipment.—New classification; formerly included in "Foundry and machine-shop products not elsewhere classified" industry.

Foundry and machine shop products not elsewhere classified.—Elevators and industrial ice-making machinery, formerly classified in this industry, transferred to "Elevators and elevator equipment" and "Refrigerators and refrigerating and ice-making apparatus" industries, respectively.

Refrigerators and refrigerating and ice-making apparatus.—New classification formed by combining "Refrigerators and refrigerator cabinets, exclusive of mechanical refrigerating equipment" industry, in Group 3, with "Refrigerators, mechanical" industry, in Group 13, and transferring industrial ice-making and refrigerating machinery from "Foundry and machine-shop products not elsewhere classified" to the new classification.

GROUP 14.—TRANSPORTATION EQUIPMENT, AIR, LAND, AND WATER

No change.

GROUP 15.—RAILROAD REPAIR SHOPS

No change.

GROUP 16.—MISCELLANEOUS INDUSTRIES

Cigars and cigarettes.—Formerly a single industry; now two industries, "Cigars" and "Cigarettes."

Furs, dressed.—Title changed to "Furs, dressed and dyed."

Stationery goods not elsewhere classified.—Papeteries, formerly classified in this industry, transferred to "Paper goods not elsewhere classified."

28. **Industrial areas.**—Because of the fact that the area of which an important city is the business and industrial center usually extends some distance beyond the municipal boundaries, manufactures statistics for the city alone do not present a true picture of its industrial importance. For this reason 33 "industrial areas" have been established for census purposes. Each of these includes an important manufacturing city, or two or more such cities, and comprises the entire county or counties in which the city or cities are located, together with any adjoining county or counties in which there is great concentration of manufacturing industry. Under *normal conditions* the factories in each of these industrial areas employ at least 40,000 wage earners, and those in the 33 areas together employ more than half of all the wage earners in manufacturing industries in the United States.

Statistics by industries have been published in a series of rotaprinted reports for 32 of the industrial areas; but for one of them—the Dayton area, consisting of Montgomery County, Ohio—it is impossible to publish figures for either the most important industry or for industries which in the aggregate contributed at least 50 percent of the total number of wage earners in the area without disclosing, exactly or approximately, data pertaining to individual establishments, and therefore no report for this area has been issued. A summary table giving combined statistics for all industries for each industrial area is included in Chapter II.

The industrial area must not be confused with the "metropolitan district," as established for population-census purposes, which includes, together with the central city or cities, all the adjacent civil divisions having at least 150 inhabitants per square mile. Each industrial area comprises one or more entire counties, whereas all metropolitan districts include parts of counties.

29. **Other industrial census statistics.**—In addition to the census of manufactures, the Bureau makes special inquiries in regard to production, sales, shipments, stocks, consumption, new orders, etc., of a large number of commodities or classes of commodities.

The reports on these inquiries are issued at intervals ranging from a month to a year, each presenting statistics on some one class of commodities or on some specific industrial trend, service, or condition. These reports cover such subjects as production of boots and shoes, leather and knit-wool gloves, men's and boys' clothing, work clothing, and wheat flour; orders for electrical goods and air-conditioning equipment; volume of automobile financing and public merchandise warehousing; manufacturers' sales of automobiles and of paint, varnish, and lacquer products; wool consumption, stocks of wool on hand, and activity of wool machinery; production and shipments of paperboard, hosiery, underwear, malleable castings, etc. These reports are intended to be of current rather than of historical value and are issued within a very short time after the collection of the data.